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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/812,800	03/30/2004	Rick C. Stevens	5801EA253	6037

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ST. PAUL, MN 55107

EXAMINER

DUPUIS, DEREK L

ART UNIT	PAPER NUMBER
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2883

MAIL DATE	DELIVERY MODE
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05/16/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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Office Action Summary

Application No.

10/812,800

Applicant(s)

STEVENS, RICK C.

Examiner

Derek L. Dupuis

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 April 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 5-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 5-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 May 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 4/27/2007 has been entered.

Response to Arguments

2. Applicant's arguments filed 4/27/2007 have been fully considered but they are not persuasive. Specifically, regarding claims 11-20, applicant argues on pages 9-14 that the prior art does not teach optical fibers having angle cut faces. The examiner respectfully disagrees. As pointed out in the final rejection, the ferrules of the prior art have fibers in their bore holes. As understood and routinely practiced in the art, the end faces of the ferrules (and the fibers in their center bores) are polished at angles to reduce back reflections. This is suggested in the prior art (see column 7, lines 16-34 of Takahashi). Further support is Takahashi's teaching that the ferrule edge is finished by polishing the ferrule surface at seven to eight degrees. This results in a reduction in the optical power loss due to the reflection at the interfaces of the device. See column 7, lines 16-34. This suggestion by Takahashi to angle the optical interface is another suggestion to angle the optical fiber edges. Applicant's arguments have been statements as to why the device might not have angled fibers. These arguments are not such that a modification to angle the fibers would not have been obvious. Specifically, applicant argues on page 10 that the circumference of the fibers are sufficiently smaller than the ferrule edges thereby preventing

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them from being polished. The examiner disagrees with this assessment. The circumference of the fiber has no bearing on whether or not it can be polished.

3. In page 11, applicant argues that there is no rotational joint in the device of Takahashi. The examiner disagrees. The fibers in Takahashi can rotate, therefore there is a rotational joint.

4. In page 11, applicant argues that there is no alignment sleeve in Takahashi. The examiner disagrees, the holder in Takahashi is sleeve-like and is used to align the optical fibers for coupling.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1, 2, and 5-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

7. Claim 1 does not clearly set forth what the scope of the claim comprises. As required by 37 C.F.R. 1.75(e) a claim must contain the following:

- (1) A preamble comprising a general description of all the elements or steps of the claimed combination which are conventional or known,
- (2) A phrase such as "wherein the improvement comprises," or "comprising" or "including," and
- (3) Those elements, steps, and/or relationships which constitute that portion of the claimed combination which the applicant considers as the new or improved portion.

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8. Basically, applicant has removed the preamble and the transitional phrase with the new amendment.

9. Claims 2 and 5-10 are dependent upon claim 1 and are rejected for the same reason.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 11-13, 16, and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Takahashi (US 5,136,681)*.

12. Regarding independent claim 11, Takabashi teaches an apparatus for optical coupling shown best in figure 3. The coupler comprises a first optical fiber (34) in a ferrule (42) with an angle cut terminus. The device includes a rotational joint on the first fiber (34) (see column 5, 64-68). A second optical fiber (33) is located in a second ferrule (41) having an angle cut terminus. The angle cut terminus edges of the ferrules are positioned such that the optical fibers (33 and 34) can transmit light therebetween (see column 4, lines 44-50). The angled surfaces minimize back reflections of light (see column 7, lines 16-21). The device also includes an alignment sleeve (59) for holding the ends of the fibers in rotational alignment with respect to each other. While the reference does not explicitly show a fiber having an angle cut terminus, fibers (33 and 34) are understood to be in the ferrules (41 and 42) to permit the transmission discussed above and it would be obvious to one of ordinary skill in the art that the fibers would have an end face similar to that of the ferrules. A ferrule holds a fiber in its center bore. The

fiber is inserted into a ferrule and the fiber extends through the ferrule and terminates at the end face of the ferrule. The end of the fiber is generally flush with the end face of the ferrule. When the ferrule end face is polished or cut, the fiber also undergoes the same treatment since the end face of the fiber is in the same plane as the end face of the ferrule. While this is not explicitly stated in the reference, this is understood because it is commonly known and routinely used in the art of optical fibers.

13. Regarding claim 12, Takabashi teaches a device for optical coupling as discussed above in reference to claim 11. Takabashi teaches that the rotational joint includes an alignment guide (56 wherein the threads are used as guides).

14. Regarding claim 13, Takabashi teaches a device for optical coupling as discussed above in reference to claim 11. As shown in figure 3, the fiber ends can be butt connectable at the ends.

15. Regarding independent claim 16, Takabashi teaches a method of twist free optical coupling comprising forming a rotational butt coupled joint in an optical lead (34) having a terminus (35) (see column 5, lines 64-68). A coupling face (35) is located on the terminus of the optical lead (34). A mating coupling face is formed on the terminus (36) of a second optical lead (33). The first optical lead (34) coupling face is rotationally aligned with the coupling face of the second optical lead (33) to thereby transmit an optical signal therebetween (see column 4, lines 44-50). The maximum rotation of the optical lead (34) is 180 degrees which limits twisting of the optical lead (34). The angle cut faces (35 and 36) minimize back reflections (see column 6, lines 15-37 and column 7, lines 14-21). While the reference does not explicitly show a fiber having an angle cut terminus, fibers (33 and 34) are understood to be in the ferrules (41 and 42)

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to permit the transmission discussed above and it would be obvious to one of ordinary skill in the art that the fibers would have an end face similar to that of the ferrules. A ferrule holds a fiber in its center bore. The fiber is inserted into a ferrule and the fiber extends through the ferrule and terminates at the end face of the ferrule. The end of the fiber is generally flush with the end face of the ferrule. When the ferrule end face is polished or cut, the fiber also undergoes the same treatment since the end face of the fiber is in the same plane as the end face of the ferrule. While this is not explicitly stated in the reference, this is understood because it is commonly known and routinely used in the art of optical fibers.

16. Regarding claims 18-20, Takabashi teaches a method as discussed above in reference to claim 16. An alignment sleeve (59) is used to rotationally align the coupling angle cut face of the first optical lead and the second optical lead as shown in figures 3 and 4 (see column 4, lines 56-58). An alignment guide (55 and 56) is used to align the coupling faces of the optical leads (33 and 34). A rotational joint is also located on the second optical fiber (33) (see column 5, lines 1-17).

17. Claims 14, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Takahashi (US 5,136,681)* as applied to claims 11-13, 16, and 18-20 above, and further in view of *Snow et al (US 5,039,193)*.

18. Regarding claims 14, and 17, Takahashi et al teach an optical coupler, a device for optical coupling, and a method of optical coupling as discussed above in reference to claims 11, and 16 respectively. Takahashi does not explicitly teach an optical conducting substance having an index of refraction matching an index of refraction of the first optical fiber/lead and the second optical fiber/lead located proximate the end of the first optical fiber and the end of the second

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optical fiber or proximate the butt connectable end in the rotational joint or in the butt coupled joint. In other words, adding an index-matched fluid between the end of ferrules 41 and 42.

19. Snow et al teach the use of an optical conducting substance having an index of refraction matching an index of refraction of optical fibers in a rotating joint (column 2, lines 17-19).

20. It would have been obvious to one of ordinary skill in the art at the time of invention to modify the invention of Takabashi and include an optical conducting substance having an index of refraction matching the index of refraction of the first and second optical fibers proximate the end of the first and second fibers or proximate the butt connectable end in the rotational joint.

21. The motivation is to improve return losses (column 2, lines 17-19). In other words, the index-matching fluid improves return losses by reducing reflections that normally occur at glass-air boundaries.

22. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Takahashi (US 5,136,681)* in view of *Snow et al (US 5,039,193)*.

23. Regarding independent claim 15, Takabashi teaches an apparatus for optical coupling and decoupling as shown in figures 3 and 4. The device includes a first optical lead (33) having a butt connectable end. A first ferrule (41) holds the first optical lead (33). A second optical lead (34) has a butt connectable end and is held in a second ferrule (42). The second ferrule (42) holds the second lead (34) in rotational relationship with respect to the first optical lead (33) (see column 5, lines 64-68). The first and second ferrules (41 and 42) each have an angle cut terminus to allow passage of an optical signal through the end face (see column 4, lines 44-50).

24. While the reference does not explicitly show a fiber having an angle cut terminus, fibers (33 and 34) are understood to be in the ferrules (41 and 42) to permit the transmission discussed

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above and it would be obvious to one of ordinary skill in the art that the fibers would have an end face similar to that of the ferrules. A ferrule holds a fiber in its center bore. The fiber is inserted into a ferrule and the fiber extends through the ferrule and terminates at the end face of the ferrule. The end of the fiber is generally flush with the end face of the ferrule. When the ferrule end face is polished or cut, the fiber also undergoes the same treatment since the end face of the fiber is in the same plane as the end face of the ferrule. While this is not explicitly stated in the reference, this is understood because it is commonly known and routinely used in the art of optical fibers.

25. Takahashi does not explicitly teach a transparent substance extending between the butt connectable end of the first lead and the second lead having an index of refraction matching an index of refraction of the first optical lead and the second optical lead to thereby inhibit loss of an optical signal therebetween while permitting rotation thereof. In other words, adding an index-matched fluid between the end of ferrules 41 and 42.

26. Snow et al teach the use of an optical conducting substance having an index of refraction matching an index of refraction of optical fibers in a rotating joint (column 2, lines 17-19).

27. It would have been obvious to one of ordinary skill in the art at the time of invention to modify the invention of Takabashi and include a transparent substance having an index of refraction matching the index of refraction of the first and second optical leads proximate the butt connectable end of the first and second leads to thereby inhibit loss of an optical signal therebetween while permitting rotation thereof.

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28. The motivation is to improve return losses (column 2, lines 17-19). In other words, the index-matching fluid improves return losses by reducing reflections that normally occur at glass-air boundaries.

Allowable Subject Matter

29. Claims 1, 2, and 5-10 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

30. The following is a statement of reasons for the indication of allowable subject matter:

31. Claim 1 would be allowable over the prior art of record because the latter, either alone or in combination, does not disclose nor render obvious a device comprising an alignment mounting sleeve, a first optical coupler mounted to the alignment sleeve, the first optical coupler having a first optical fiber and a second optical fiber, the second optical fiber rotatably mounted with respect to the first optical fiber and a second optical coupler mounted in the alignment sleeve, the second optical coupler having a third optical fiber and a fourth optical fiber, the fourth optical fiber being rotatably mounted with respect to the third optical fiber in combination with the rest of the claimed limitations.

32. Claims 2 and 5-10 are dependent upon claim 1 and would be allowable for the same reasons.

Conclusion

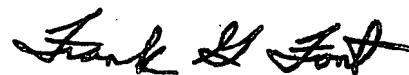
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Derek L. Dupuis whose telephone number is (571) 272-3101.

The examiner can normally be reached on Monday - Friday 8:30am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on (571) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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